IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Takayuki Toyoshima et al.
Serial No. : Unassigned
Filed : Herewith
Title : OPTICAL ELEMENT HAVING WAVELENGTH SELECTIVITY

BOX PCT
Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Prior to examination, please amend the application as follows:

In the specification:

Replace the heading beginning at page 1, line 1, with the following rewritten heading:

--Title of Invention--

Replace the heading beginning at page 1, line 4, with the following rewritten heading:

--Background of the Invention--

Delete the heading beginning at page 1, line 11.

Replace the heading beginning at page 4, line 8, with the following rewritten heading:

--Brief Summary of the Invention--

Replace the heading beginning at page 6, line 25, with the following rewritten heading:

--Brief Description of the Drawings--

CERTIFICATE OF MAILING BY EXPRESS MAIL

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3-12-02
Date of Deposit

Signature

Leroy Stokins
Typed or Printed Name of Person Signing Certificate

[redacted]

Replace the heading beginning at page 8, line 12, with the following rewritten heading:
--Detailed Description of the Invention--

Replace the heading beginning at page 8, line 13, with the following rewritten heading:
--First Embodiment--

Replace the heading beginning at page 13, line 4, with the following rewritten heading:
--Second Embodiment--

Replace the heading beginning at page 15, line 9, with the following rewritten heading:
--Third Embodiment--

Replace the heading beginning at page 16, line 11, with the following rewritten heading:
--Fourth Embodiment--

In the claims:

Amend claims 1-13 as follows:

--1. (Amended) An optical element having wavelength selectivity comprising:

a lens array having a first end face and a plurality of lenses arranged on the first end face; and

a multi-layered film filter which is formed on the first end face of the lens array and includes high refractive-index dielectric layers and low refractive-index dielectric layers laminated alternately and whose film thickness continuously changes in accordance with positions of the individual lenses.--

--2. (Amended) The optical element according to Claim 1, wherein the plurality of lenses are aligned in a line from a first end of the first end face of the lens array toward a second end of the first end face and the film thickness of the multi-layered film filter linearly changes from the first end toward the second end.--

--3. (Amended) The optical element according to Claim 1, wherein the lens array is a rod lens array including a plurality of rod lenses.--

--4. (Amended) The optical element according to Claim 1, wherein the lens array is a gradient index planar microlens including a single substrate and a plurality of microlenses formed in a line on the substrate.--

--5. (Amended) The optical element according to Claim 4, wherein the plurality of microlenses protrude from the substrate.--

--6. (Amended) The optical element according to Claim 1, wherein the lens array has a second end face facing the first end face; and

the optical element further has a light emitting device formed on the second end face for emitting light toward the multi-layered film filter via individual lenses of the lens array.--

--7. (Amended) The optical element according to Claim 6, wherein the light emitting device is integral with the lens array.--

--8. (Amended) The optical element according to Claim 6, wherein the light emitting device includes a plurality of light sources provided in association with individual lenses of the lens array.--

--9. (Amended) The optical element according to Claim1, wherein the lens array has a second end face facing the first end face; and

the optical element further has a plurality of light receiving elements formed on the second end face for respectively receiving a plurality of optical signals having different center wavelengths, obtained by demultiplexing input light by the multi-layered film filter, via individual lenses of the lens array.--

--10. (Amended) The optical element according to Claim 9, wherein the plurality of light receiving elements are integral with the lens array.--

--11. (Amended) A method of manufacturing an optical element having wavelength selectivity, comprising:

a step of preparing a lens array having a first end face and a plurality of lenses arranged on the first end face; and

a step of directly forming a multi-layered film filter on the first end face of the lens array by a physical vapor deposition method in such a way that the film thickness continuously changes in accordance with positions of the plurality of individual lenses.--

--12. (Amended) The optical element manufacturing method according to Claim 11, further comprising:

a step of arranging the lens array in such a way that the first end face of the lens array is inclined with respect to an evaporation source or a target, prior to the step of forming the multi-layered film filter.--

--13. (Amended) The optical element manufacturing method according to Claim 12, further comprising:

a step of arranging a film thickness correcting plate having a substantially trapezoidal opening portion between the lens array and the evaporation source or target, prior to the step of forming the multi-layered film filter.--

REMARKS

Applicant respectfully requests entry of the amendments to the specification and claims as shown herein. The specification has been amended to include US-style headings. The claims have been amended to eliminate multiple dependency and introduce US-style verbiage in the claims. No new matter has been added.

Please apply any other charges or credits to Deposit Account No. 06-1050, referencing attorney docket no. 13630-004US1.

Respectfully submitted,

Date: 3-12-02

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Version with markings to show changes made

In the specification:

Heading beginning at page 1, line 1, has been amended as follows:

[DESCRIPTION] Title of Invention

Heading beginning at page 1, line 4, has been amended as follows:

[[Technical Field]] Background of the Invention

Heading beginning at page 1, line 11, has been amended as follows:

[[Background Art]]

Heading beginning at page 4, line 8, has been amended as follows:

[[Disclosure of Invention]] Brief Summary of the Invention

Heading beginning at page 6, line 25, has been amended as follows:

[[]Brief Description of the Drawings[]]

Heading beginning at page 8, line 12, has been amended as follows:

[[Best Mode for Carrying Out the Invention]] Detailed Description of the Invention

Heading beginning at page 8, line 13, has been amended as follows:

[[]First Embodiment[]]

Heading beginning at page 13, line 4, has been amended as follows:

[[]Second Embodiment[]]

Heading beginning at page 15, line 9, has been amended as follows:

[[]]Third Embodiment[]]

Heading beginning at page 16, line 11, has been amended as follows:

[[]]Fourth Embodiment[]]

In the claims:

Claims 1-13 have been amended as follows:

1. (Amended) An optical element having wavelength selectivity[, characterized by] comprising:

a lens array having [one] a first end face and a plurality of lenses [(L1-L8)] arranged on the [one] first end face; and

a multi-layered film filter [(13)] which is formed on the [one] first end face [(14)] of the lens array and includes high refractive-index dielectric layers and low refractive-index dielectric layers laminated alternately and whose film thickness continuously changes in accordance with positions of the individual lenses.

2. (Amended) The optical element according to Claim 1, [characterized in that] wherein the plurality of lenses are aligned in a line from a first end of the first end face of the lens array toward a second end [from a first end of the one] of the first end face [of the lens array] and the film thickness of the multi-layered film filter linearly changes from the first end toward the second end [from the first end].

3. (Amended) The optical element according to Claim 1 [or 2], [characterized in that] wherein the lens array is a rod lens array including a plurality of rod lenses.

4. (Amended) The optical element according to Claim 1 [or 2], [characterized in that] wherein the lens array is a gradient index planar microlens [(50, 60)] including a single substrate [(59, 69)] and a plurality of microlenses [(51-56, 61-66)] formed in a line on the

substrate.

5. (Amended) The optical element according to Claim 4, [characterized in that] wherein the plurality of microlenses [(61-66)] protrude from the substrate.

6. (Amended) The optical element according to [any one of Claims 1 to 5] Claim 1, [characterized in that] wherein the lens array has [an other] a second end face [(24)] facing the [one] first end face; and

the optical element further has a light emitting device [(30)] formed on the [other] second end face for emitting light toward the multi-layered film filter via individual lenses of the lens array.

7. (Amended) The optical element according to Claim 6, [characterized in that] wherein the light emitting device is integral with the lens array.

8. (Amended) The optical element according to Claim 6 [or 7], [characterized in that] wherein the light emitting device includes a plurality of light sources [(LD1-LD8)] provided in association with individual lenses of the lens array.

9. (Amended) The optical element according to [any one of Claims 1 to 5] Claim1, [characterized in that] wherein the lens array has [an other] a second end face facing the [one] first end face; and

the optical element further has a plurality of light receiving elements [(PD1-PD8)] formed on the [other] second end face for respectively receiving a plurality of optical signals having different center wavelengths, obtained by demultiplexing input light by the multi-layered film filter, via individual lenses of the lens array.

10. (Amended) The optical element according to Claim 9, [characterized in that] wherein the plurality of light receiving elements are integral with the lens array.

11. (Amended) A method of manufacturing an optical element having wavelength selectivity, [characterized by] comprising:

a step of preparing a lens array [(12)] having [one] a first end face and a plurality of lenses [(L1-L8)] arranged on the [one] first end face; and

a step of directly forming a multi-layered film filter on the [one] first end face of the lens array by a physical vapor deposition method in such a way that the film thickness continuously changes in accordance with positions of the plurality of individual lenses.

12. (Amended) The optical element manufacturing method according to Claim 11, further [characterized by] comprising:

a step of arranging the lens array in such a way that the [one] first end face of the lens array is inclined with respect to an evaporation source or a target, prior to the step of forming the multi-layered film filter.

13. (Amended) The optical element manufacturing method according to Claim 12, further [characterized by] comprising:

a step of arranging a film thickness correcting plate [(70)] having a substantially trapezoidal opening portion [(71)] between the lens array and the evaporation source or target, prior to the step of forming the multi-layered film filter.